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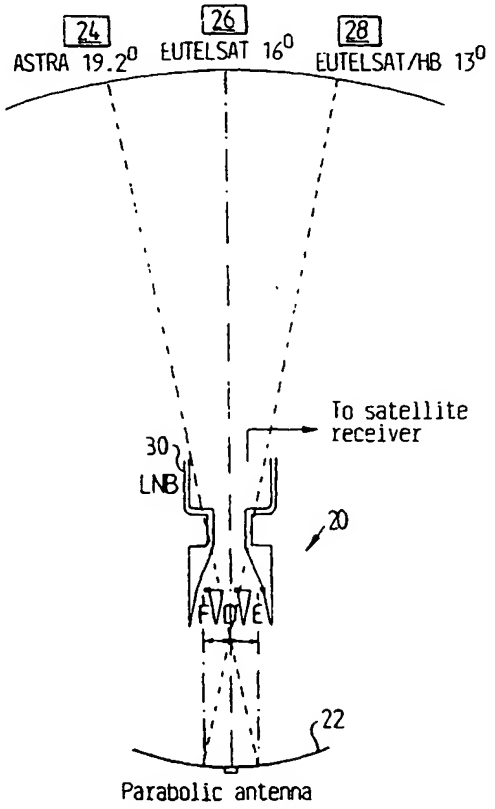
(54) Title: SATELLITE RECEIVER



(57) Abstract: In a satellite receiver a feeder element is provided that includes several feeder horns on a micro head for distributing satellite signals from different satellites to different channels in the different horns and means for blocking all channels, except for the one that is presently desired to be used, before the signals sent on these channels reach the micro head.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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SATELLITE RECEIVER

TECHNICAL FIELD

The present invention relates to a satellite receiver, and particularly a satellite receiver arranged to receive signals from several different satellites.

STATE OF THE ART

An equipment for receiving TV-channels (signals), which are sent out from several different satellites, today consists of a parabolic antenna of varying size and several side mounted micro heads which are directed towards the middle of the parabolic antenna and, via a switch, can be selected and show TV-channels from different satellite directions.

Thus, today´s satellite receiver requires a micro head for each satellite from which the parabolic antenna is arranged to receive signals. Of course, this is expensive.

Furthermore it is not possible to reach adjacent satellites with this conventional side mounting. The reason is that the physical space required by each micro head makes it physically impossible to locate these so close to each other as would be required for e.g. receiving signals from satellites located at, for example, a distance of 3 degrees from each other, which is a normal distance between two satellites.

To be able to receive mutually adjacent signals in today´s satellite receiver system, motor operation of the parabolic

antenna is required. Such a motor operation is both expensive and difficult to set up. As always when movable parts are required, there is a great risk that an error will appear and that expensive repair costs will arise.

The Swedish patent application 8802441-9, the American patents US 5,276,904 and US 5,283,591 and the international patent application WO 99/54958 all describe conventional satellite receivers for receiving signals from several different satellites. An example of the appearance of such a conventional receiver equipment is illustrated in Fig. 1. The equipment includes i.a. a parabolic antenna 1 and micro heads 9.

Also, the US patent No. 5,812,096 discloses a satellite antenna having a Siamese feedhorn. The use of the Siamese feedhorn enables the receiver to receive signals from satellites being close. But still requires a multitude of LNB:s.

DESCRIPTION OF THE INVENTION

There is an object of the present invention to provide a satellite receiver that avoids all the above mentioned disadvantages present in conventional satellite receivers for receiving signals from several satellites.

This object and other ones are attained by means of a satellite receiver provided with a feeder element including at least two feeder horns located on, or in connection with, a micro head for distributing satellite signals from different satellites on different channels and means for blocking all channels, except for the one that presently is desired, before the signals sent on these channels reach the micro head (LNB).

Thus there is arranged a feeder element including an optional number of feeder horns, depending on the number of satellites from which a user desires to receive signals. The feeder element is provided with a blocking/opening system. Blocking/opening can be carried through electronically, mechanically, or both in connection, and depending on which horn the user at a certain occasion desires the satellite signal to be received. Controlling blocking/opening is performed via the satellite receiver or similar.

With the device herein described also signals from adjacent satellites can be received without any special arrangements. The system can furthermore be put together/set up with a conventional micro head (LNB) and is suitable in parabolic antenna plants existing today, which most often use 40 millimetre holders.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described more closely by means of not limiting examples and with reference to the attached drawings, on which:

- Fig. 1 shows a conventional satellite receiver for receiving signals from several satellites.
- Fig. 2 shows a schematic view of a receiver equipment for receiving satellite signals provided with a feeder element.
- Fig. 3 more closely shows a section through a feeder element shown in Fig. 2.
- Fig. 4 shows a perspective view of a feeder element with three feeder horns.
- Fig. 5 is a block diagram of a satellite receiver connected to a feeder element shown in Fig. 2.

DESCRIPTION OF PREFERRED EMBODIMENTS

Fig. 2 shows a schematic view of a satellite receiver equipment provided with a feeder element 20 arranged on a micro head (LNB) 30. The micro head 30 receives signals from different satellites via a parabolic antenna 22. The satellites can e.g. be ASTRA 24, EUTELSAT 26 and EUTELSAT/HB 28.

The signals from the different satellites are received by the parabolic antenna and are directed towards the micro head provided with the feeder element 20. In the feeder element 20 one of the signals from the different satellites 24, 26 or 28 is selected to be fed to the micro head. This is described more closely below in connection with Fig. 3. The signal received by the micro head is then transferred in a conventional manner to a satellite receiver.

Fig. 3 shows a feeder element 20 in more detail. In the embodiment shown in Figs. 2-4 the feeder element 20 has three feeder horns 32, 34 and 36. The number of horns can, however, be varied depending upon the number of different satellites from which signals are desired to be received.

Each horn 32, 34 and 36 is furthermore provided with an individual blocking means 38, 40 and 42, respectively, for blocking a signal through the respective horn. The means 38, 40 and 42 can either be mechanical, electrical or electromechanical and are arranged to be controlled individually so as to allow signals from the different satellites to pass through only one horn at a time.

The signal from the satellite 24 is thus conducted through the horn 32, the signal from the satellite 26 through the horn 34 and the signal from the satellite 28 through the horn 36. At reception of the signal from the satellite 24 the horns 34 and 36 are blocked by means of the blocking means 40 and 42. Reception of signals from the satellites 26 and 28 is attained in a corresponding way.

Preferably, the horns 32, 34 and 36 should have such a shape that the distance between an imaginary central line through each horn is 30 millimetres, the distance a - a in Fig. 3. Furthermore the feeder element preferably has a base with an outer diameter of 40 millimetres as a maximum so as to suit conventional micro heads, the distance b - b in Fig. 3.

Fig. 4 illustrates a perspective view of the feeder element 20 with three feeder horns 32, 34 and 36.

In Fig. 5 a block diagram of a printed circuit card used to extract the desired signal for the satellite receiver is shown. The printed circuit card comprises an LNB. The circuit card also comprises horn switches for switching between the different horns. The switches are controlled by a logic unit.

By arranging a suitable number of feeder horns, depending on the number of satellites from which the user desires to receive signals, the problems of the prior art are avoided. The separation/spacing of the satellites is irrelevant in this context.

By the device described here also signals from adjacent satellites can be received without any special arrangements,

such as motor operation, or similar, of the receiver equipment.

The system can furthermore be put together/assembled with a conventional micro head (LNB), and therefore a receiver system according to that described here provides a cost-effective way of receiving signals from different satellites.

CLAIMS

1. Receiver for receiving satellite signals including at least one LNB and a parabolic antenna, **characterized** by a feeder element comprising at least two feeder horns arranged between the LNB and the parabolic antenna for feeding the signals propagating through the at least two feeder horns to one and the same LNB.

2. Receiver according to claim 1, **characterized** by means for blocking at least one feeder horn.

3. Receiver according to claim 2, **characterized** by means for blocking all horns except for the one conducting the signal of the satellite from which presently a signal is desired to be received.

4. A feeder element to be located between a parabolic antenna and an LNB including at least two feeder horns **characterized by** a blocking system arranged in the feeder element for individual blocking of the feeder horns.

5. A feeder element according to claim 4, **characterized** in that all horns but one is blocked.

6. A feeder element according to claim 4 or 5, **characterized** in that the distance from a central line through a first horn to an adjacent second horn is 30 millimetres.

7. A feeder element according to any of claims 4 - 6, **characterized** in that the outer diameter of the base of the feeder element is 40 millimetres as a maximum.

8. A feeder element according to any of claims 4 - 7, **characterized** in that the blocking system is electronic.

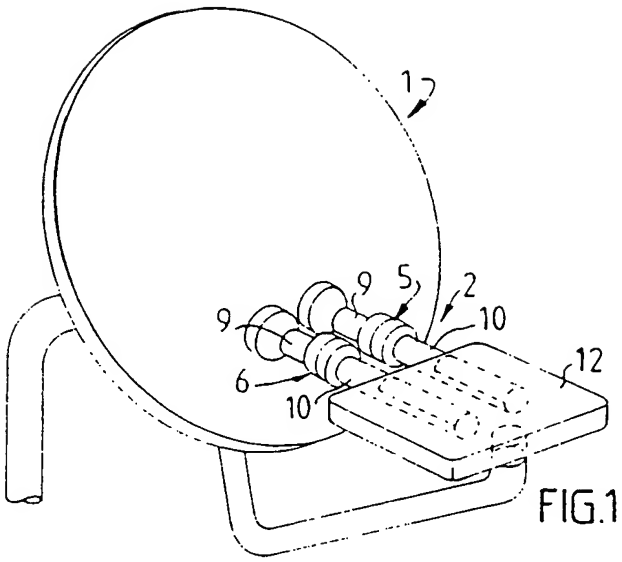


FIG.1

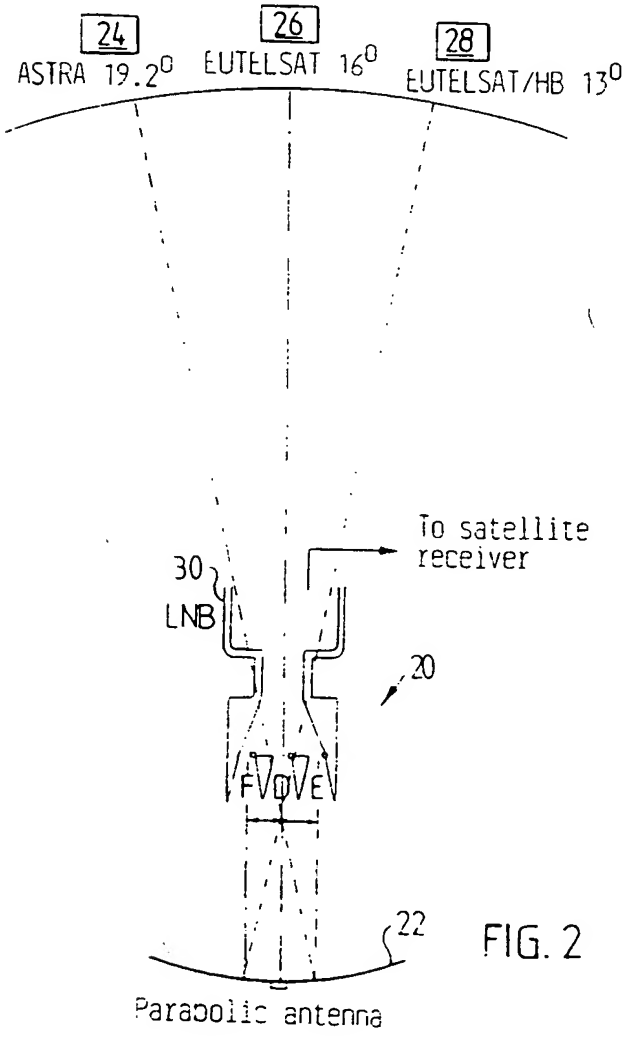
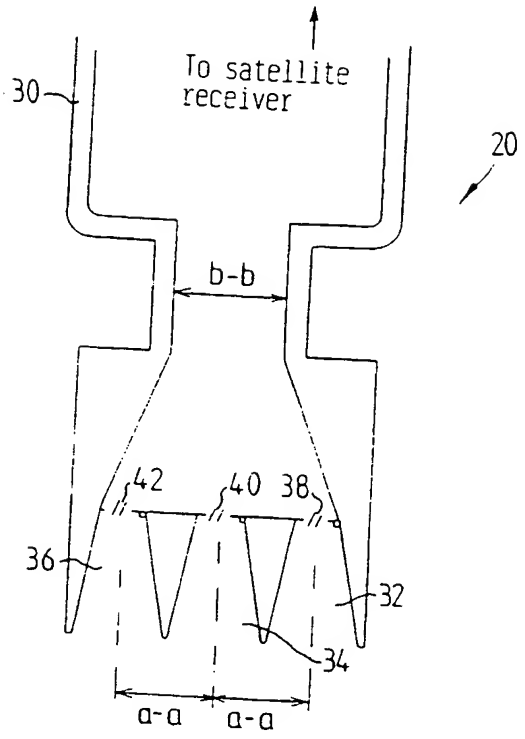


FIG. 2



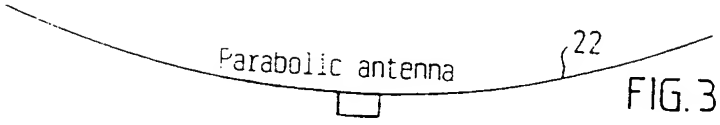


FIG. 3

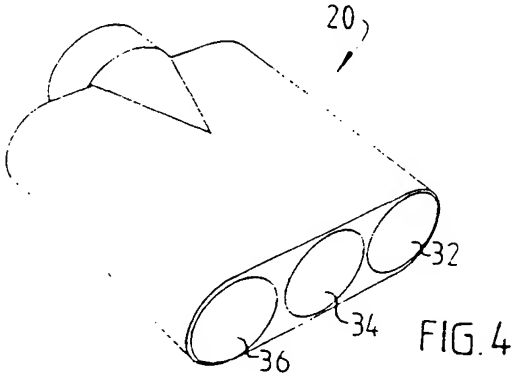


FIG. 4

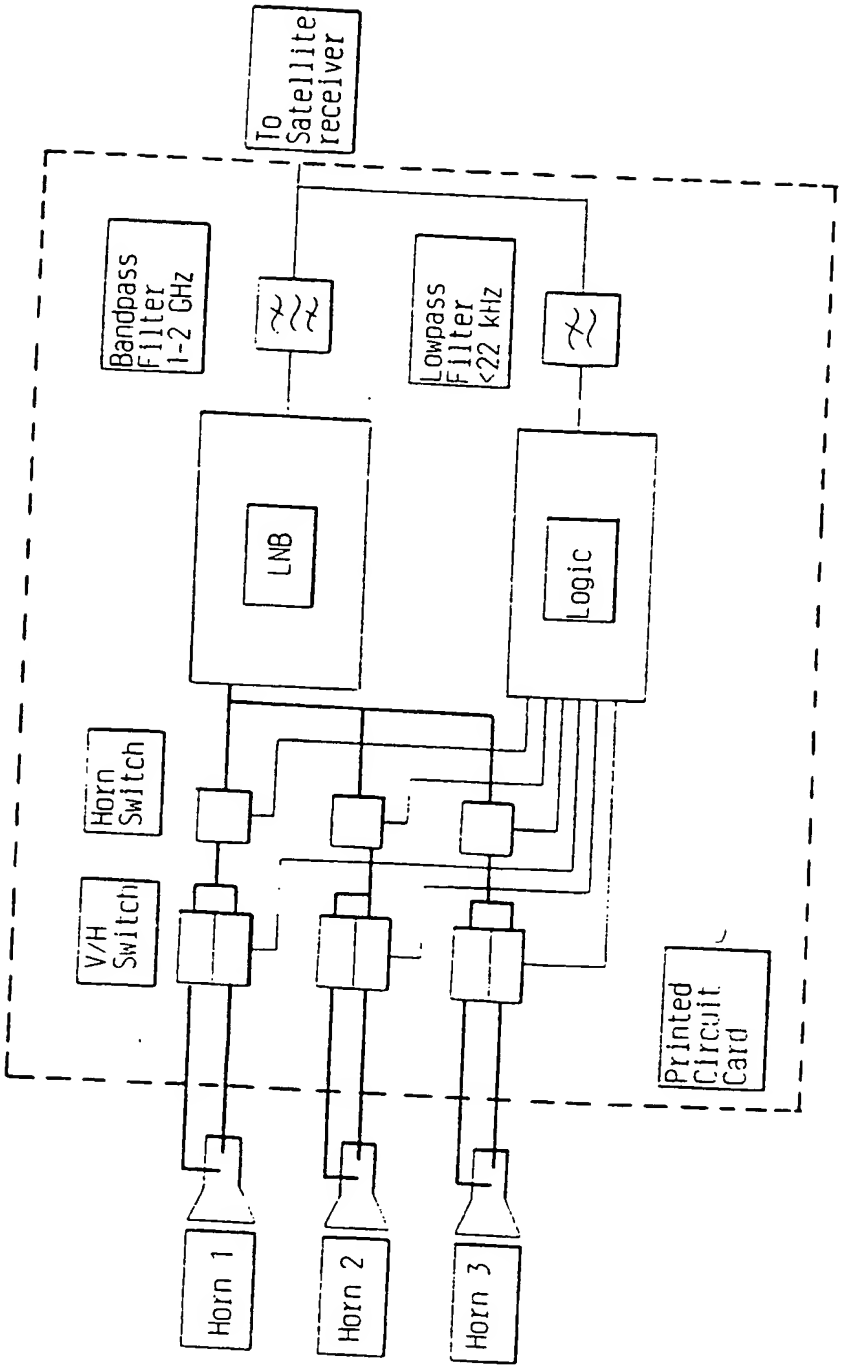


FIG.5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 00/02681

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H01Q 13/02
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H01Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5812096 A (TILFORD), 22 Sept 1998 (22.09.98), figures 2, 4A ---	1,3-5
A	WO 9954958 A1 (ORGANISATION EUROPEENNE DE TELECOMMUNICATIONS PAR SATELLITE EUTELSAT), 28 October 1999 (28.10.99), figures 1-2, abstract ---	1-8
A	EP 0843381 A2 (YAGI ANTENNA CO LTD.), 20 May 1998 (20.05.98), whole document ---	1-8

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 March 2001	02-04-2001
Name and mailing address of the ISA Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. + 46 8 666 02 86	Authorized officer Rune Bengtsson/BS Telephone No. + 46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 00/02681

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9602953 A1 (COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION), 1 February 1996 (01.02.96), whole document -- --------	1-8

INTERNATIONAL SEARCH REPORT

Information on patent family members

25/02/01

International application No.
PCT/SE 00/02681

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5812096 A	22/09/98	NONE	
WO 9954958 A1	28/10/99	AU 3336399 A	08/11/99
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		EP 0995233 A	26/04/00
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		PL 337210 A	14/08/00
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		US 6121939 A	19/09/00
		JP 10163737 A	19/06/98
		JP 10173562 A	26/06/98
WO 9602953 A1	01/02/96	AU 689283 B	26/03/98
		AU 2972095 A	16/02/96
		US 5751254 A	12/05/98